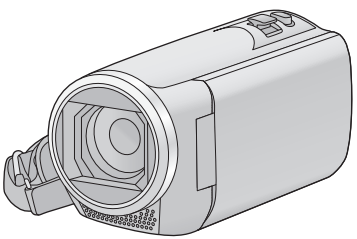
Panasonic

Basic Owner's Manual

High Definition Video Camera

Model No. **HC-V270**



Please read these instructions carefully before using this product, and save this manual for future use.

More detailed operating instructions are available in "Owner's Manual (PDF format)". To read it, download it from the website.
https://eww.pavc.panasonic.co.jp/hdw/oi/V270/
- Click the desired language.

AVCHD Progressive

Register online at www.panasonic.com/register (U.S. customers only)

If you have any questions, visit :
U.S.A. : www.panasonic.com/support
Canada : www.panasonic.ca/english/support

SQT0665

PP

Dear Customer,

Thank you for choosing Panasonic!
You have purchased one of the most sophisticated and reliable products on the market today. Used properly, we're sure it will bring you and your family years of enjoyment. Please take time to fill in the information on the right.
The serial number is on the tag located on the back of your camera. Be sure to **retain this manual** as your convenient camera information source.

Date of Purchase

Dealer Purchased From

Dealer Address

Dealer Phone No.

Model No.

Serial No.

Safety Precautions

WARNING:

To reduce the risk of fire, electric shock or product damage,

- Do not expose this unit to rain, moisture, dripping or splashing.
- Do not place objects filled with liquids, such as vases, on this unit.
- Use only the recommended accessories.
- Do not remove covers.
- Do not repair this unit by yourself. Refer servicing to qualified service personnel.

CAUTION!

To reduce the risk of fire, electric shock or product damage,

- Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure this unit is well ventilated.
- Do not obstruct this unit's ventilation openings with newspapers, tablecloths, curtains, and similar items.
- Do not place sources of naked flames, such as lighted candles, on this unit.

THE FOLLOWING APPLIES ONLY IN THE U.S.A.

FCC Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:	To assure continued compliance, follow the attached installation instructions and use only shielded interface cables with ferrite core when connecting to computer or peripheral devices.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Declaration of Conformity	
Trade Name:	Panasonic
Model No.:	HC-V270
Responsible Party:	Panasonic Corporation of North America Two Riverfront Plaza, Newark, NJ 07102-5490
Support Contact:	http://www.panasonic.com/contactinfo

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Panasonic
HC-V270

THE FOLLOWING APPLIES ONLY IN CANADA.

CAN ICES-3(B)/NMB-3(B)

IMPORTANT SAFETY INSTRUCTIONS

Read these operating instructions carefully before using the unit. Follow the safety instructions on the unit and the applicable safety instructions listed below. Keep these operating instructions handy for future reference.

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with dry cloth.

7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11) Only use attachments/accessories specified by the manufacturer.

12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13) Unplug this apparatus during lightning storms or when unused for long periods of time.

14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

AC adaptor

This AC adaptor operates on AC between 110 V and 240 V.
But

- In the U.S.A. and Canada, the AC adaptor must be connected to a 120 V AC power supply only.
- When connecting to an AC supply outside of the U.S.A. or Canada, use a plug adaptor to suit the AC outlet configuration.

The power plug is the disconnecting device. Install this unit so that the power plug can be unplugged from the socket outlet immediately.

■ Concerning the battery

Battery pack (Lithium ion battery pack)

- Use the specified unit to recharge the battery pack.
- Do not use the battery pack with equipment other than the specified unit.
- Do not get dirt, sand, liquids, or other foreign matter on the terminals.
- Do not touch the plug terminals (+ and −) with metal objects.
- Do not disassemble, remodel, heat or throw into fire.

If any electrolyte should come into contact with your hands or clothes, wash it off thoroughly with water.
If any electrolyte should come into contact with your eyes, never rub the eyes. Rinse eyes thoroughly with water, and then consult a doctor.

Warning

Risk of fire, explosion and burns. Do not disassemble, heat above 60 °C (140 °F) or incinerate.

CAUTION

- Danger of explosion if battery is incorrectly replaced. Replace only with the type recommended by the manufacturer.
- When disposing of the batteries, please contact your local authorities or dealer and ask for the correct method of disposal.

■ Product Identification Marking

Product	Location
High Definition Video Camera	Battery holder
AC adaptor	Bottom

Conforms to UL STD 60065.
Certified to CAN/CSA STD C22.2 No.60065.

U.S.A. CONSUMERS: ATTENTION:

A lithium ion battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

THE FOLLOWING APPLIES ONLY IN THE U.S.A.

Contains FCC ID: VPYLBVX532

FCC WARNING
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65.
This equipment has very low levels of RF energy that are deemed to comply without testing of specific absorption ratio (SAR).

THE FOLLOWING APPLIES ONLY IN CANADA.

Contains IC: 772C-LBVX604

This device complies with RSS-210 of the IC Rules.
Operation is subject to the following two conditions:
(1)This device may not cause harmful interference,
(2)This device must accept any interference received,
including interference that may cause undesired operation of the device.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules.
This equipment has very low levels of RF energy that are deemed to comply without testing of specific absorption ratio (SAR).

-If you see this symbol-

Information on Disposal in other Countries outside the European Union

This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

■ Cautions for use

The unit and the SD card become warm during use. This is not a malfunction.

Keep this unit as far away as possible from electromagnetic equipment (such as microwave ovens, TVs, video games etc.).

- If you use this unit on top of or near a TV, the pictures and/or sound on this unit may be disrupted by electromagnetic wave radiation.
- Do not use this unit near cell phones because doing so may result in noise adversely affecting the pictures and/or sound.
- Recorded data may be damaged, or pictures may be distorted, by strong magnetic fields created by speakers or large motors.
- Electromagnetic wave radiation generated by microprocessors may adversely affect this unit, disturbing the pictures and/or sound.
- If this unit is adversely affected by electromagnetic equipment and stops functioning properly, turn this unit off and remove the battery or disconnect AC adaptor. Then reinsert the battery or reconnect AC adaptor and turn this unit on.

Do not use this unit near radio transmitters or high-voltage lines.

- If you record near radio transmitters or high-voltage lines, the recorded pictures and/or sound may be adversely affected.

About connecting to a PC

- Do not use any other USB cables except the supplied one.

About connecting to a TV

- Always use the supplied HDMI mini cable or a genuine Panasonic HDMI mini cable (RP-CDHM15, RP-CDHM30: optional).

Make sure to use the supplied cords and cables. If you use optional accessories, use the cords and the cables supplied with them.
Do not extend the cords and the cables.

Do not spray insecticides or volatile chemicals onto the unit.

- If the unit is sprayed with such chemicals, its body may be marred and the surface finish may peel off.
- Do not leave rubber or plastic products in contact with the unit for a long time.

Cleaning

- Before cleaning, detach the battery or pull the AC adaptor from the AC outlet, and then wipe the unit with a soft, dry cloth.
- If the unit is very dirty, dip a cloth in water and squeeze firmly, and then wipe the unit with the damp cloth. Next, dry the unit with a dry cloth.
- Use of benzine, paint thinner, alcohol, or dishwashing liquid may alter the camera body or peel the surface finish. Do not use these solvents.
- When using a chemical dust cloth, follow the instructions that came with the cloth.

When you are not going to use the unit for an extended time

- When storing the unit in a cupboard or cabinet, it is recommended that you place a desiccant (silica gel) in with it.

Be sure to detach the battery after use.

- If the battery is left attached, a minute amount of current continues to flow even if the unit is off. Keeping the unit in this state may result in over discharge of the battery. This may result in you not being able to use the battery even after it is charged.
- The battery should be stored in a cool place free from humidity, with as constant

temperature as possible. (Recommended temperature: 15 °C to 25 °C (59 °F to 77 °F), Recommended humidity: 40%RH to 60%RH)
- To store the battery for a long period of time, we recommend you charge it once every year and store it again after you have completely used up the charged capacity.

If the operating time is very short even after the battery has been recharged, the battery has worn out. Please purchase a new battery.

About the SD card
- When the card access lamp is lit, do not:
  - Remove the SD card
  - Turn the unit off
  - Insert and remove the USB cable
  - Expose the unit to vibrations or shock

■ About the recording format for recording motion pictures

- **Motion pictures recorded with other devices are not supported by this unit.**

You can select from AVCHD[*1], MP4 or iFrame recording formats to record motion pictures using this unit.

*1 It is compatible with the AVCHD Progressive (1080/60p).

AVCHD:

It is suitable for viewing on a high-definition TV or for saving to disc[*2].

*2 The following methods are available for saving an image recorded in 1080/60p:
- Copy the image to a disc using the HD Writer LE 3.0.
- Copy the image to a Panasonic Blu-ray disc recorder that supports AVCHD Progressive.

- Blu-ray recorders are not sold in US.

MP4:

This is a recording format suitable for playing back or editing on a PC.
- It is not compatible with motion pictures recorded in AVCHD format.

iFrame:

This is a recording format suitable for playing back or editing on a Mac (iMovie etc.).
- It is not compatible with motion pictures recorded in AVCHD format.

■ Indemnity about recorded content

Panasonic does not accept any responsibility for damages directly or indirectly due to any type of problems that result in loss of recording or edited content, and does not guarantee any content if recording or editing does not work properly. Likewise, the above also applies in a case where any type of repair is made to the unit.

■ About Condensation (When the lens or the LCD monitor is fogged up)

Condensation occurs when there is a change in temperature or humidity, such as when the unit is taken from outside or a cold room to a warm room. Please be careful, as it may cause the lens or LCD monitor to become soiled, moldy, or damaged.

When taking the unit to a place which has a different temperature, if the unit is accustomed to the room temperature of the destination for about one hour, condensation can be prevented. (When the difference in temperature is severe, place the unit in a plastic bag or the like, remove air from the bag, and seal the bag.)

When condensation has occurred, remove the battery and/or the AC adapter and leave the unit like that for about one hour. When the unit becomes accustomed to the surrounding temperature, fogginess will disappear naturally.

■ Cards that you can use with this unit

SD Memory Card, SDHC Memory Card and SDXC Memory Card
- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.
- Refer to page 15 for more details on SD cards.

■ For the purposes of this owner's manual

- SD Memory Card, SDHC Memory Card and SDXC Memory Card are referred to as the "SD card".
- The smartphone and tablet are indicated as "smartphone".
- Function that can be used for Motion Picture Recording Mode:

  Function that can be used for Still Picture Recording Mode:
- Function that can be used for the Playback Mode:

  Function that can be used for the Playback Mode (motion pictures only):

  Function that can be used for the Playback Mode (still pictures only):
- Scene(s) recorded in the recording format [AVCHD]: "AVCHD scene(s)"
- Scene(s) recorded in the recording format [MP4/iFrame], scene(s) saved in MP4 (1280×720/30p) or MP4 (640×360/30p): "MP4/iFrame scene(s)"
- Pages for reference are indicated by an arrow, for example: ➜ 00

■ Installing HD Writer LE 3.0

Check the website below to download/install the software.

- The software is available for download until the end of March 2018.

http://panasonic.jp/support/global/cs/soft/download/f_le30.html

■ Downloading the Owner's Manual (PDF format)

You can check the URL and QR code of the website where you can download the Owner's Manual (PDF format) in [ONLINE MANUAL] in the Setup menu.

- **Touch ◁ (left side)/ ▷ (right side) of on the Touch Menu to display MENU . (➜ 24)**

1 Touch MENU .

2 Touch [SETUP].

3 Touch [ONLINE MANUAL].

4 Touch the access method you want to check.

[URL display]:

Displays the URL of the website on the LCD monitor of this unit.

[USB connect]:

Displays the website on a PC connected to this unit with the USB cable. Click [OIBOOK], which will be displayed on the PC.

[QR code]:

Displays the QR code of the website on the LCD monitor of this unit.

- You will need Adobe Reader to browse or print the Owner's Manual (PDF format). You can download and install a version of Adobe Reader that you can use with your OS from the following website. (As of November 2014)

http://www.adobe.com/products/acrobat/readstep2.html

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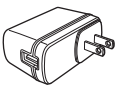
Accessories

Check the accessories before using this unit.
Keep the accessories out of reach of children to prevent swallowing.
Product numbers correct as of Nov. 2014. These may be subject to change.

Battery pack
VW-VBT190

AC adaptor
VSK0815F



DC cable
K2GHYYS00002

USB cable
K2KYYYY00236

HDMI mini cable
K1HY19YY0021

Power supply

■ About batteries that you can use with this unit

The battery that can be used with this unit is VW-VBT190/VW-VBT380.

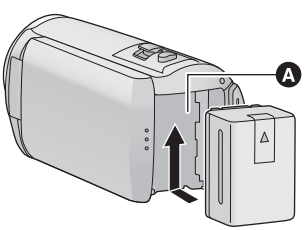
- **The unit has a function for distinguishing batteries which can be used safely. The dedicated battery (VW-VBT190/VW-VBT380) supports this function. The only batteries suitable for use with this unit are genuine Panasonic products and batteries manufactured by other companies and certified by Panasonic. Panasonic cannot in any way guarantee the quality, performance or safety of batteries which have been manufactured by other companies and are not genuine Panasonic products.**

It has been found that counterfeit battery packs which look very similar to the genuine product are made available to purchase in some markets. Some of these battery packs are not adequately protected with internal protection to meet the requirements of appropriate safety standards. There is a possibility that these battery packs may lead to fire or explosion. Please be advised that we are not liable for any accident or failure occurring as a result of use of a counterfeit battery pack. To ensure that safe products are used we would recommend that a genuine Panasonic battery pack is used.

Inserting/removing the battery

- **Press the power button to turn off the unit. (➜ 16)**

Install the battery by inserting it in the direction shown in the figure.

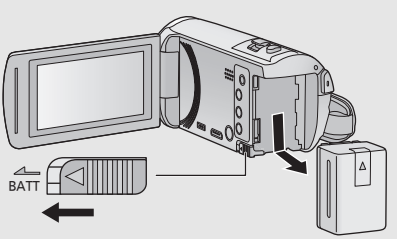


Ⓐ Battery holder

Insert the battery until it clicks and locks.

Removing the battery

Be sure to hold down the power button until the status indicator goes off. Then remove the battery while supporting the unit to prevent it from dropping.
Move the battery release lever in the direction indicated by the arrow and remove the battery when unlocked.



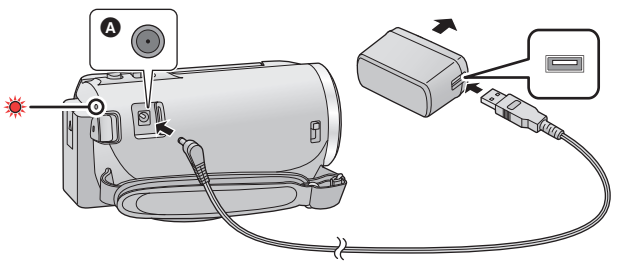
Charging the battery

When this unit is purchased, the battery is not charged. Charge the battery fully before using this unit for the first time.

The unit is in the standby condition when the AC adaptor is connected. The primary circuit is always "live" as long as the AC adaptor is connected to an electrical outlet.

Important:

- **Do not use the AC adaptor/DC cable with any other equipment as it is designed only for this unit. Also, do not use the AC adaptor/DC cable from other equipment with this unit.**
- **The battery will not be charged if the unit is turned on.**
- **It is recommended to charge the battery in a temperature between 10 °C and 30 °C (50 °F and 86 °F). (The battery temperature should also be the same.)**



A DC input terminal

1 Connect the DC cable to the AC adaptor and to the DC input terminal of this unit.

- Insert the plugs as far as they will go.

2 Insert the AC adaptor into an AC outlet.

- The status indicator will flash red at an interval of approximately 2 seconds (approximately 1 second on, approximately 1 second off), indicating that charging has begun.
  It will turn off when the charging is completed.

■ Connecting to the AC outlet

It is possible to use this unit with power supplied from the AC outlet by turning on the unit with the AC adaptor connected.
Even when you use the AC adaptor for recording images, keep the battery connected.
This allows you to continue the recording even if a power failure occurs or the AC adaptor is unplugged from the AC outlet by accident.

■ To charge by connecting to other device

It is possible to charge by connecting to other device with the USB cable (supplied).

- Do not use any other DC cables except the supplied one.
- Do not use any other AC adaptors except the supplied one.
- We recommend using Panasonic batteries (➜ 12).
- If you use other batteries, we cannot guarantee the quality of this product.
- Do not heat or expose to flame.

- Do not leave the battery(ies) in a car exposed to direct sunlight for a long period of time with doors and windows closed.

Charging and recording time

■ Charging/Recording time

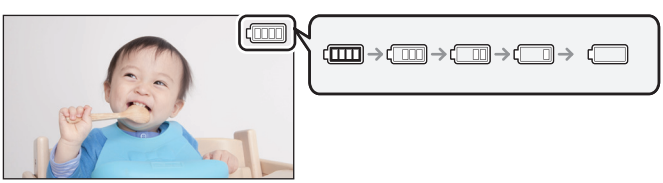
- Temperature: 25 °C (77 °F)/humidity: 60%RH
- Charging times in parentheses are when charging from the USB terminal.

Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording format	Recording mode	Maximum continuous recordable time	Actual recordable time
Supplied battery/ VW-VBT190 (optional) [3.6 V/1940 mAh]	2 h 20 min (5 h 20 min)	[AVCHD]	[1080/60p]	2 h	1 h
			[PH],[HA]	2 h 5 min	1 h 5 min
			[HG],[HE]	2 h 10 min	
		[MP4/ iFrame]	[1080]	2 h	1 h
			[720]	2 h 30 min	1 h 15 min
			[iFrame]	2 h 35 min	1 h 20 min

- “h” is an abbreviation for hour, “min” for minute and “s” for second.
- These times are approximations.
- **The indicated charging time is for when the battery has been discharged completely. Charging time and recordable time vary depending on the usage conditions such as high/ low temperature.**
- The actual recordable time refers to the recordable time when repeatedly starting/stopping recording, turning the unit on/off, moving the zoom lever etc.

■ Battery capacity indication

The battery capacity indication is displayed on the LCD monitor.



- The display changes as the battery capacity reduces. → → → → → If the battery discharges, then will flash red.

Recording to a card

The unit can record still pictures or motion pictures to an SD card. To record to an SD card, read the following.

Cards that you can use with this unit

Use SD cards conforming to Class 4 or higher of the SD Speed Class Rating for motion picture recording.

Please confirm the latest information about SD Memory Cards/SDHC Memory Cards/SDXC Memory Cards that can be used for motion picture recording on the following website.
http://panasonic.jp/support/global/cs/e_cam
(This website is in English only.)

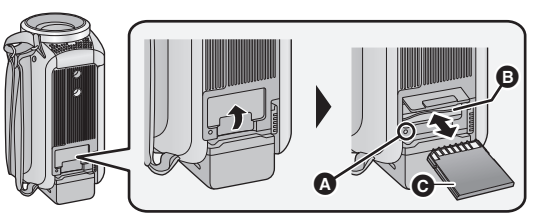
- Keep the Memory Card out of reach of children to prevent swallowing.

Inserting/removing an SD card

When using an SD card not from Panasonic, or one previously used on other equipment, for the first time on this unit, format the SD card. (➜ 24) When the SD card is formatted, all of the recorded data is deleted. Once the data is deleted, it cannot be restored.

Caution:

Check that the access lamp has gone off.



Access lamp [ACCESS] Ⓐ

- When this unit is accessing the SD card, the access lamp lights up.

1 Open the SD card cover and insert (remove) the SD card into (from) the card slot Ⓑ.

- Face the terminal side Ⓒ in the direction shown in the illustration and press it straight in as far as it will go.
- Press the center of the SD card and then pull it straight out.

2 Securely close the SD card cover.

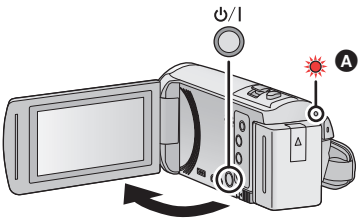
- Securely close it until it clicks.

Turning the unit on/off

You can turn the unit on and off using the power button or by opening and closing the LCD monitor.

Turning the unit on and off with the power button

Open the LCD monitor and press the power button to turn on the unit.



To turn off the unit

Hold down the power button until the status indicator goes off.

Ⓐ The status indicator lights on.

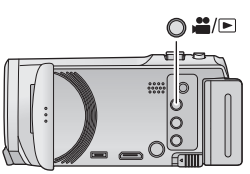
The unit is turned on when the LCD monitor is opened, and unit is turned off when it is closed.

Selecting a mode

You can switch this unit between Recording Mode (Motion Picture Recording Mode/Still Picture Recording Mode) and Playback Mode by pressing the recording/playback button.
If you touch the recording mode switching icon in Recording Mode, this unit can be switched between Motion Picture Recording Mode and Still Picture Recording Mode.

Motion Picture Recording Mode (➜ 21)	**Recording motion pictures.**
Still Picture Recording Mode (➜ 21)	**Recording still pictures.**
Playback Mode (➜ 22)	**Motion picture/Still picture playback.**

Switching this unit between Recording Mode and Playback Mode



Recording/playback button

Press the button to switch this unit between Recording Mode and Playback Mode.

- When you turn on this unit, it starts up in Recording Mode.

Switching this unit between Motion Picture Recording Mode and Still Picture Recording Mode

Touch the recording mode switching icon displayed on the LCD monitor (touch screen) to switch this unit between Motion Picture Recording Mode and Still Picture Recording Mode.

1 Press the recording/playback button to switch this unit to Recording Mode.

- The recording mode switching icon Ⓐ is displayed on the screen.

	Motion Picture Recording Mode
	Still Picture Recording Mode

(Motion Picture Recording Mode)

2 Touch the recording mode switching icon.

- Refer to page 17 for touch screen operation.

To display the recording mode switching icon

Display of the recording mode switching icon will disappear when no touch operation is performed for a specific period of time. To display it again, touch the screen.

- If the recording start/stop button is pressed in Still Picture Recording Mode or Playback Mode, this unit will be switched to Motion Picture Recording Mode. During motion picture/still picture playback or in other conditions, even if the recording start/stop button is pressed, the recording mode may not be switched.

Preparation

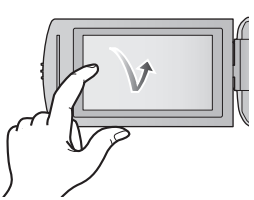
How to use the touch screen

You can operate by directly touching the LCD monitor (touch screen) with your finger.

■ Touch

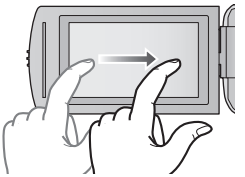
Touch and release the touch screen to select icon or picture.

- Touch the center of the icon.
- Touching the touch screen will not operate while you are touching another part of the touch screen.



■ Slide while touching

Move your finger while pressing on the touch screen.



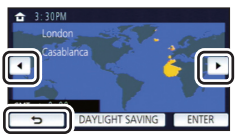
■ About the operation icons

▲/▼/◀/▶:

Touch when changing a page or performing settings.

⮌:

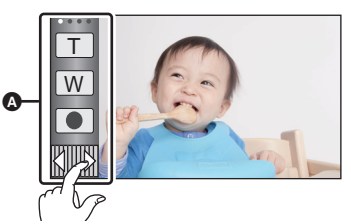
Touch to return to the previous screen.



About the Touch Menu

Touch ◁ (left side)/▷ (right side) of ▯▯▯ on the Touch Menu to switch the operation icons.

- It is also possible to switch the operation icons by sliding the Touch Menu right or left while touching it.



A Touch Menu

■ To display the Touch Menu

Display of the Touch Menu will disappear when no touch operation is performed for a specific period of time during recording of motion picture/still picture. To display it again, touch ▯▯▯.

Setting date and time

The clock is not set at the time of purchase. Make sure to set the clock.

- **When you turn on this unit, the message “Set home region and date/time.” may be displayed. Select [YES], and follow the steps below to make these settings:**
  - Step 2 of “Setting your home region for the first time”
  - Steps 2–3 of “Setting date and time”

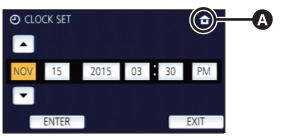
1 Select the menu. (➜ 24)

MENU : [SETUP] → [CLOCK SET]

2 Touch the date or time to be set, then set the desired value using ▲/▼.

Ⓐ Displaying the World Time setting:
[HOME]/ [DESTINATION]

- The year can be set between 2000 and 2039.



3 Touch [ENTER].

- Touch [EXIT] to complete the setting.

Setting your home region for the first time

You can set your home region in [SET WORLD TIME].

1 Select the menu. (➜ 24)

MENU : [SETUP] → [SET WORLD TIME]

- A message will be displayed. Touch [ENTER].

2 Touch ◀/▶ to select your home region and touch [ENTER].

- When the clock is not set, the current time is displayed as “--:----”.

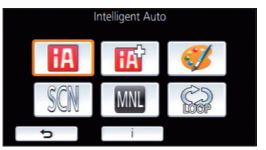
Ⓐ The current time
Ⓑ The time difference from GMT (Greenwich Mean Time)

- For information on how to change your home region or set the region of your travel destination, refer to the Owner’s Manual (PDF format).

Changing the Recording Mode

1 **Touch the Recording Mode button icon.**

2 **Touch the desired Recording Mode button icon.**

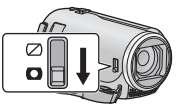


Mode		Effect
*1 *2	**Intelligent Auto**	You can switch the mode to the Intelligent Auto Mode, which optimizes settings to the recording environment you are in.
*1 *2	**Intelligent Auto Plus**	You can add manually-adjusted brightness and color balance settings to the Intelligent Auto Mode, and record.
*1	**Creative Control**	You can record motion pictures with added effects.
SCN	**Scene Mode**	This option allows this unit to automatically adjust the shutter speed and aperture, etc. according to the scene you want to record.
MNL	**Manual**	You can set the shutter speed, focus, White Balance and brightness (iris/gain).
*1	**Endless Loop Recording**	No matter how long you record, you can only record scenes for the last 1 hour to SD card.

*1 In Motion Picture Recording Mode only
*2 In Still Picture Recording Mode only

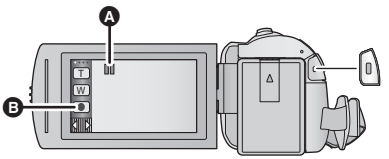
Recording motion pictures

- **Open the lens cover before turning on the unit.**



1 **Open the LCD monitor, and set this unit to Motion Picture Recording Mode. (➜ 17)**

2 **Press the recording start/stop button to start recording.**



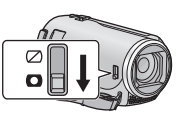
Ⓐ When you begin recording, ❚❚ changes to ●.
Ⓑ Recording button icon

3 **Press the recording start/stop button again to pause recording.**

- Recording can also be started/stopped by touching the recording button icon.

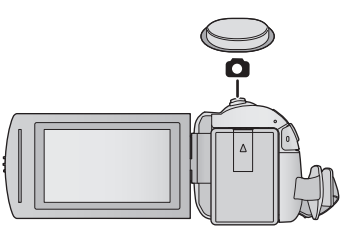
Recording still pictures

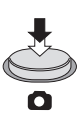
- **Open the lens cover before turning on the unit.**



1 **Open the LCD monitor, and set this unit to Still Picture Recording Mode. (➜ 17)**

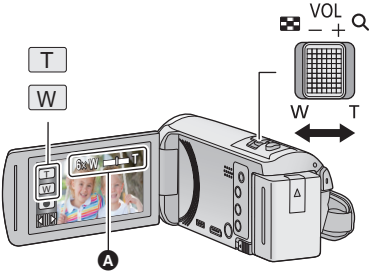
2 **Press the button halfway. (For Auto Focus only)**





3 **Press the button fully.**

Using the zoom



Zoom lever/Zoom button icons

T side:
Close-up recording (zoom in)

W side:
Wide-angle recording (zoom out)

- The zoom speed varies depending on the range over which the zoom lever is moved.

A Zoom bar

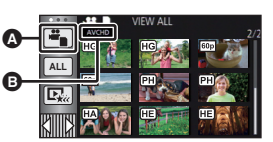
The zoom bar is displayed during the zoom operation.

Motion picture/Still picture playback

1 Set this unit to Playback Mode (➜ 16).

2 Touch the play mode select icon A (➜ 18).

- You can also set by touching MENU, selecting [VIDEO SETUP] or [PICT. SETUP] → [MEDIA, VIDEO/PICTURE]. (➜ 24)



3 Select the still picture C or the recording format of the motion picture D you wish to play back.

- Touch [Enter].

4 (When [AVCHD] or [MP4/iFrame] is touched)
Touch the desired recording format for playback.

- **When [AVCHD] is selected**

[ALL AVCHD]/[1080/60p]/[1080/60i]

- **When [MP4/iFrame] is selected**

[ALL MP4/iFrame]/[1080/60p]/[720/30p]/[360/30p]/[iFrame]

- The recording mode icon B is displayed in the thumbnail display when the item is touched. (AVCHD, 1080/60p, 1080/60i, MP4/iFrame, 1080, 720, 360 and i Frame)

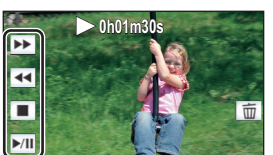
- The following icons are displayed on thumbnails when [ALL AVCHD] or [1080/60i] is touched:
  - AVCHD [1080/60p] scene: 60p
  - AVCHD [PH] scene: PH
  - AVCHD [HA] scene: HA
  - AVCHD [HG] scene: HG
  - AVCHD [HE] scene: HE
- The following icons are displayed on thumbnails when [ALL MP4/iFrame] is touched:
  - MP4 [1080/60p] scene: 1080
  - MP4 [720/30p] scene: 720
  - MP4 [360/30p] scene: 360
  - iFrame scene: iFrame

5 Touch the scene or the still picture to be played back.

- To display the next (previous) page:
  - Slide the thumbnail display upward (downward) while touching it.
  - Switch the Touch Menu, and then touch ▲ (up) / ▼ (down) on the thumbnail scroll lever.

6 Select the playback operation by touching the operation icon.

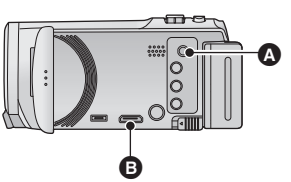
- Operation icons and screen display will disappear when no touch operation is performed for a specific period of time. To display them again, touch the screen.
- Touch ▶/❚❚ to start/pause playback of motion pictures.



Operation icon

Watching Video/Pictures on your TV

Connect this unit to a TV using an HDMI mini cable (supplied) or a Composite video cable (commercially-available).



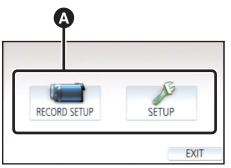
Ⓐ A/V connector [A/V]
Ⓑ HDMI mini connector [HDMI]

Using the menu screen

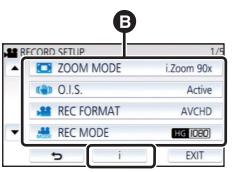
- **Touch ◁ (left side)/ ▷ (right side) of [REC] on the Touch Menu to display [MENU]. (➜ 18)**

1 Touch [MENU].

2 Touch the top menu Ⓐ.



3 Touch the submenu Ⓑ.



- Next (previous) page is displayed by touching ▲/▼.

4 Touch the desired item to enter the setting.

5 Touch [EXIT] to exit the menu setting.

■ About [i] guide display

After touching [i], touching the submenus and items will cause function descriptions and settings confirmation messages to appear.

- After the messages have been displayed, the guide display is canceled.

Language selection

You can select the language on the screen display and the menu screen.

[MENU] : [SETUP] → [LANGUAGE] → desired language

Formatting

Please be aware that if a medium is formatted, then all the data recorded on the medium will be erased and cannot be restored. Back up important data on a PC, DVD disc etc.

[MENU] : [SETUP] → [FORMAT MEDIA] → desired media

[SD CARD]/[HDD]*

* Displayed when connecting a USB HDD. (Refer to the Owner's Manual (PDF format))

- Media selection screen is not displayed when the USB HDD is not connected. Touch [YES].
- **Do not format an SD card using any other equipment such as a PC. The card may not be used on this unit.**

What you can do with the Wi-Fi® function

This unit offers the following Wi-Fi functions when used in combination with another Wi-Fi compatible device.

[Link to Cell]	Using a smartphone, you can perform record/playback operations from a remote location or upload motion pictures and still pictures recorded in this unit on SNS (Social Networking Service).
[Baby Monitor]	You can use your smartphone to check on your baby being monitored by this unit when you are in another room. The smartphone and this unit can be used like radio transceivers, allowing the users to have a conversation by taking turns. This unit can also send a notification to the smartphone whenever the baby cries.
[Home Cam]	You can confirm the recording screen of this unit from outside using a smartphone.
[DLNA Play]	Connecting this unit to a DLNA-compatible TV via Wi-Fi, you can play back scenes and still pictures on the TV.
[Copy]	By setting up a Wi-Fi communication between this unit and a PC, you can copy scenes and still pictures recorded with this unit to the PC.
[Live Cast]	You can broadcast motion pictures of this unit live by setting up a link between the “LUMIX CLUB” and USTREAM.
[History]	Each use of a Wi-Fi function is stored in the Wi-Fi connection history. Connecting from the history allows you to easily set up a connection using the previous connection settings.

Before using any of these Wi-Fi functions, check the settings of your device and get it ready for use. This Basic Owner’s Manual describes the procedure for using [Link to Cell] to provide a Wi-Fi connection example.

- For details on how to use those Wi-Fi functions and set up a connection, refer to the Owner’s Manual (PDF format).

■ This unit is NFC-compatible

Using the NFC (Near Field Communication) function, you can easily transfer data necessary for a Wi-Fi connection between this unit and the smartphone.
This function can be used with the NFC compatible device with Android™ (OS version 2.3.3 or later). (Except for some models)

■ This unit is WPS-compatible

WPS (Wi-Fi Protected Setup™) is a function that allows you to easily set up a connection with a wireless LAN device and make security-related settings.

[Link to Cell]

■ Before using [Link to Cell]

- **You need to turn on the Wi-Fi function of your smartphone.**
- **Do not remove the SD card during remote operations.**

Caution:
Be sure to pay special attention to the privacy, the likeness rights, etc. of the subject when you use this function. Use at your own risk.

Install the “Image App”

About the “Image App”
The “Image App” is an application provided by Panasonic.

	For Android apps	For iOS apps
OS	**Android 2.3.3 or later***	**iOS 6.0 or later* (iPhone 3GS is not supported.)**
Installation procedure	**1 Connect your Android device to a network.** **2 Select “Google Play™ Store”.** **3 Enter “Panasonic Image App” into the search box.** **4 Select “Panasonic Image App” and install it.** ● The icon will be added to the menu.	**1 Connect your iOS device to a network.** **2 Select “App Store℠”.** **3 Enter “Panasonic Image App” into the search box.** **4 Select “Panasonic Image App” and install it.** ● The icon will be added to the menu.

* The supported OS version are current as of November 2014 and subject to change.
- Use the latest version.
- Refer to [Help] in the “Image App” menu about how to operate.
- The service may not be able to be used properly depending on the type of smartphone being used. For information on the “Image App”, check the support website below.
  http://panasonic.jp/support/global/cs/e_cam
  (This Site is English only.)
- When downloading the app on a mobile network, high packet communication fees may be incurred depending on the details of your contract.

Preparations before using [Link to Cell]

Check if the smartphone is an Android (NFC-compatible), Android (non-NFC-compatible), or iOS device.

- If the smartphone is NFC-compatible, the NFC mark is displayed when you start up “Image App”.

Setting up a direct Wi-Fi connection between this unit and a smartphone

Using NFC, you can easily set up a direct connection between this unit and the smartphone.

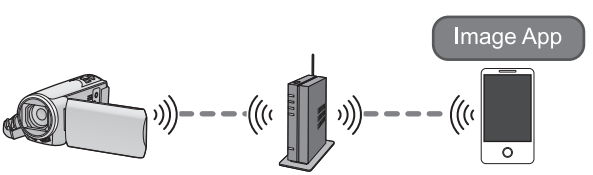
■ If the device is Android (NFC-compatible)

Use NFC to set up a direct connection between this unit and the smartphone. (➜ 28)

■ If the device is Android (non-NFC-compatible) or iOS

Scan a QR code to set up a direct connection between this unit and the smartphone. (➜ 28)

Setting up a Wi-Fi connection via a wireless access point



1 Check if the wireless access point is compatible with IEEE802.11b/g/n.

2 Set up a Wi-Fi connection between this unit and the wireless access point.

- [WPS Connection] (➜ 29)
- Searching for wireless access points to set up a connection (➜ 30)

If your wireless access point is compatible with WPS, proceed to [WPS Connection] (➜ 29)

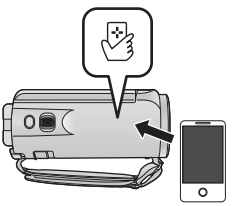
Using [Link to Cell] with a direct connection

Use NFC to set up a direct connection between this unit and the smartphone.

- **Set the NFC function of the smartphone to on.**

1 **Start up the smartphone application “Image App”.**

2 **Touch the smartphone on of this unit.**



- Touch the NFC touch area when the NFC mark is displayed on the smartphone screen.
- If this is the first time the smartphone is connecting to this unit, touch [YES] on the screen of this unit, and then touch the smartphone on of this unit again.
- If the unit is not recognized even when touching the smartphone, change positions and try again.
- The connection cannot be established while this unit is recording.
- When the connection is complete, images of this unit is displayed on the smartphone screen.
- This unit is turned on even if it touches the smartphone on of this unit, where this unit is turned off with a LCD monitor.

Scan a QR code to set up a direct connection between this unit and the smartphone.

1 **Press Wi-Fi button on this unit and touch [Wi-Fi Setup].** Wi-Fi

2 **Touch [Direct Connection].**

3 **Touch [Change connection type] and select [QR code]**

- QR code is displayed on the screen of this unit.

4 **Start up the smartphone application “Image App”.**

5 **On the smartphone, select [QR code] to scan the QR code displayed on the screen of this unit.**

(If the device is Android)

- The connection will be completed. The image from this unit will be displayed on the smartphone screen.

(If the device is iOS)

- Follow the steps below:

❶ Select the option that allows you to install the app on the profile screen of the “Image App”, and follow the on-screen instructions to complete the installation.
❷ Press the home button to close the displayed screen.
❸ Select the network name (SSID) of this unit from the Wi-Fi setup of the smartphone. The connection will be completed. The image from this unit will be displayed on the smartphone screen.

- When you cannot scan the QR code, refer to “Connecting by entering an SSID and Password” in the Owner’s Manual (PDF format).
- Transmission speed may decrease, or may not be usable depending on the environment it is used in.

Using [Link to Cell] with a wireless access point connection

Check if the wireless access point you are using is compatible with WPS

– If the wireless access point is compatible with WPS:
Proceed to the following [WPS Connection]

– If the wireless access point is not compatible with WPS:
“Searching for wireless access points to set up a connection” (➜ 30)

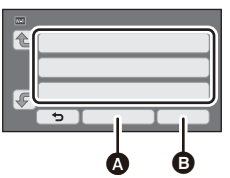
[WPS Connection]

1 Press Wi-Fi button on this unit. Wi-Fi

- When the Wi-Fi button is pressed for the first time, a message is displayed. Touch [YES], and proceed to step 4.

2 Touch [Wi-Fi Setup] and select [Wireless Settings].

3 Touch the part with no display of a wireless access point.



A [Delete]
B [ENTER]

4 Touch [WPS Connection].

5 Set the wireless access point to waiting for WPS.

- For further details, please read the operating instructions for the wireless access point. (When using a tethering connection, please read the operating instructions for the smartphone.)
- A message is displayed when the connection is complete. Touch [ENTER], and exit [Wireless Settings]
- A message is displayed when the connection attempt fails. Touch [ENTER], and set the connection again.

6 Connect the smartphone to a wireless access point.

7 Touch [Link to Cell] and start up the smartphone application “Image App”.

- When the connection is complete, images of this unit is displayed on the smartphone screen.

- For information on how to set a PIN code, refer to the Owner’s Manual (PDF format).
- When this unit is connected to a wireless access point, you can also use NFC to remotely operate this unit with the smartphone via the wireless access point. For details, refer to “Using [Link to Cell] with a wireless access point connection” in the Owner’s Manual (PDF format).

Searching for wireless access points to set up a connection

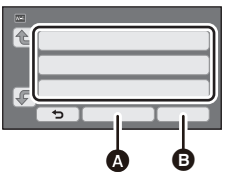
- Confirm Encryption key (Password) of the selected wireless access point if the network authentication is encrypted.

1 Press Wi-Fi button on this unit. Wi-Fi

- When the Wi-Fi button is pressed for the first time, a message is displayed. Touch [YES], and proceed to step 4.

2 Touch [Wi-Fi Setup] and select [Wireless Settings].

3 Touch the part with no display of a wireless access point.



A [Delete]
B [ENTER]

4 Touch [Search for wireless network].

5 Touch the wireless access point to connect.

- If you touch [Refresh], you can search for wireless access points again.
- If you touch [i] and select a wireless access point, all characters will be displayed. In this case, touch [ENTER].
- If no wireless access points are displayed, refer to “Setting up a connection manually” in the Owner’s Manual (PDF format).
- If an Encryption key (Password) is not set, the connection is complete and a message is displayed. Touch [ENTER] to exit [Wireless Settings], and proceed to Step 7

6 (When there is an Encryption key (Password))
Enter the Password.

- For information on how to enter characters, refer to the Owner’s Manual (PDF format).
- When the entry is complete, touch [Enter].
- The connection will be completed and a message will be displayed. Touch [ENTER], and exit [Wireless Settings]

7 Connect the smartphone to a wireless access point.

8 Touch [Link to Cell] and start up the smartphone application “Image App”.

- When the connection is complete, images of this unit is displayed on the smartphone screen.

- When this unit is connected to a wireless access point, you can also use NFC to remotely operate this unit with the smartphone via the wireless access point. For details, refer to “Using [Link to Cell] with a wireless access point connection” in the Owner’s Manual (PDF format).

If the Wi-Fi connection cannot be established

- Please refer to the operating instruction of the device in use for details about the setting of the wireless access point or smartphone.

Problem	Check points
It cannot connect to the wireless access point. **The wireless access point is not detected.**	**(General)** ● Turn on the wireless access point. ● Approach the wireless access point and reconnect. ● If it takes time to complete the connection, the Wi-Fi connection will be aborted. Reset the connection settings. ● Check how to connect to the wireless access point and how to set the security settings. ● If the wireless access point supports both the 2.4 GHz band and the 5 GHz band, check if the setting for the 2.4 GHz band is enabled. ● Make sure the wireless access point is registered in this unit. ● The device may be unable to locate the wireless access point due to problems with the signal. Refer to “Connecting by entering an SSID and Password” in the Owner’s Manual (PDF format). **([WPS Connection])** ● Make sure the wireless access point is in the correct WPS standby mode. **([Search for wireless network])** ● Make sure the Password have been correctly input.
Radio waves of the wireless access point get disconnected.	● The condition may improved by moving the location or changing the angle of the wireless access point. ● If you use another 2.4 GHz band device such as a microwave oven or cordless telephone nearby, you may interrupt the signal. Keep a sufficient distance from these types of devices.
The Wi-Fi connection is not possible between this unit and a smartphone.	**(Wireless Access Point Connection)** ● Make sure the smartphone is properly connected to the wireless access point by checking the Wi-Fi settings of the smartphone. ● Make sure this unit and the smartphone are connected to the same wireless access point. ● Make sure the wireless access point is registered in this unit. **(Direct Connection)** ● Make sure the smartphone is properly connected to this unit by checking the Wi-Fi settings of the smartphone. ● Make sure the smartphone is not connected to the wireless access point. If it is connected to the wireless access point, change the Wi-Fi access point using the smartphone’s Wi-Fi set up.
The Wi-Fi connection is disconnected immediately.	● If there is a setting for avoiding poor connections in the Wi-Fi setting menu of the Android™ device 4.0 or later version, turn it off.

Troubleshooting

■ It is not a malfunction in following cases

A clicking sound is heard when the unit is shaken.	● This is the sound of the lens moving and is not a defect. This sound will no longer be heard when the unit is turned on and set this unit to the Motion Picture Recording Mode or Still Picture Recording Mode.
Object seems to be warped.	● Object seems to be warped slightly when the object moves across the image very fast, but this is because the unit is using MOS for the image sensor. This is not a malfunction.
The lens or LCD monitor fog up.	● This is due to condensation. It is not a malfunction. Please refer to page 8.

Power	
Problem	**Check points**
This unit cannot be turned on. **This unit does not stay on long enough.** **Battery runs down quickly.**	● Charge the battery again to ensure it is sufficiently charged. (➜ 13) ● In cold places, the battery using time becomes shorter. ● The battery has a limited life. If the operating time is still too short even after the battery is fully charged, the battery has worn out and needs to be replaced.
This unit cannot be operated though it is turned on. **This unit does not operate normally.**	● Remove the battery or AC adaptor, wait about 1 minute and then reconnect the battery or AC adaptor. Then about 1 minute later, turn on the unit again. (Conducting the above operation while the media is being accessed may damage the data on the media.) ● If normal operation is still not restored, detach the power connected, and consult the dealer who you purchased this unit from.
“ERROR OCCURRED. PLEASE TURN UNIT OFF, THEN TURN ON AGAIN.” is displayed.	● The unit has automatically detected an error. Restart the unit by turning the unit off and on. ● The unit will be turned off in about 1 minute if the unit is not turned off and on. ● Repair is needed if it is repeatedly displayed even if it is restarted. Detach the power connected, and consult the dealer who you purchased this unit from. Do not attempt to repair the unit by yourself.

Recording	
Problem	**Check points**
Color or brightness of the image changes, or you may see horizontal bars in the image. **The LCD monitor flickers indoors.**	● Color or brightness of the image may change, or you may see horizontal bars in the image when the object is recorded under fluorescent light, mercury light or sodium light, etc., but this is not a malfunction. ● In Motion Picture Recording Mode, record in Intelligent Auto Mode/Intelligent Auto Plus Mode or set the shutter speed to 1/60 in areas where the power supply frequency is 60 Hz, or 1/100 in areas of 50 Hz. ● In Still Picture Recording Mode, this will not affect the recorded image.

Playback	
Problem	**Check points**
Scenes/still pictures cannot be played back.	● Any scenes/still pictures where the thumbnails are displayed as [!] cannot be played back.

Please refer to "Owner's Manual (PDF format)" for details.

About copyright

■ Carefully observe copyright laws

Whatever you have recorded and created can be used for your personal entertainment only. Under copyright laws, other materials cannot be used without obtaining permission from the holders of the copyrights.

■ Licenses

- SDXC Logo is a trademark of SD-3C, LLC.
- “AVCHD”, “AVCHD Progressive” and the “AVCHD Progressive” logo are trademarks of Panasonic Corporation and Sony Corporation.
- Manufactured under license from Dolby Laboratories. Dolby and the double-D symbol are trademarks of Dolby Laboratories.
- HDMI, the HDMI Logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.
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- iMovie, Final Cut Pro, Mac and OS X are trademarks of Apple Inc. registered in the U.S. and other countries.
- iPhone is a trademark of Apple Inc., registered in the U.S. and other countries.
- App Store is a service mark of Apple Inc.
- Android and Google Play are trademarks or registered trademarks of Google Inc.
- The Wi-Fi CERTIFIED™ Logo is a certification mark of Wi-Fi Alliance®.
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- “Wi-Fi®” is a registered trademark of Wi-Fi Alliance®.
- “Wi-Fi Protected Setup™”, “WPA™”, and “WPA2™” are trademarks of Wi-Fi Alliance®.
- The N-Mark is a trademark or registered trademark of NFC Forum, Inc. in the United States and in other countries.
- DLNA, the DLNA Logo and DLNA CERTIFIED are trademarks, service marks, or certification marks of the Digital Living Network Alliance.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

This product is licensed under the AVC patent portfolio license for the personal and non-commercial use of a consumer to (i) encode video in compliance with the AVC Standard (“AVC Video”) and/or (ii) decode AVC Video that was encoded by a consumer engaged in a personal and non-commercial activity and/or was obtained from a video provider licensed to provide AVC Video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA, LLC.
See http://www.mpegla.com.

This product incorporates the following software:
(1) the software developed independently by or for Panasonic Corporation,
(2) the software owned by third party and licensed to Panasonic Corporation,
(3) the software licensed under the GNU General Public License, Version 2.0 (GPL V2.0),
(4) the software licensed under the GNU LESSER General Public License, Version 2.1 (LGPL V2.1), and/or
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The software categorized as (3) - (5) are distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. Refer to the detailed terms and conditions thereof, which can be displayed by following the procedure described in [SOFTWARE INFO] under “Using the Setup Menu” in the Owner’s Manual (PDF format).

At least three (3) years from delivery of this product, Panasonic will give to any third party who contacts us at the contact information provided below, for a charge no more than our cost of physically performing source code distribution, a complete machine-readable copy of the corresponding source code covered under GPL V2.0 or LGPL V2.1, as well as the respective copyright notice thereof.
Contact Information: oss-cd-request@gg.jp.panasonic.com

The source code and the copyright notice are also available for free in our website below.
http://panasonic.net/avc/oss/index.html

Specifications

High Definition Video Camera
Information for your safety

Power source:
DC 5.0 V (When using AC adaptor)
DC 3.6 V (When using battery)

Power consumption:
Recording; 4.7 W
Charging; 7.7 W

Motion picture recording format:
[AVCHD];
AVCHD format version 2.0 compliant (AVCHD Progressive)
[MP4/iFrame];
MPEG-4 AVC file format compliant (.MP4)

Motion picture compression:
MPEG-4 AVC/H.264

Audio compression:
[AVCHD];
Dolby® Digital/2 ch
[MP4/iFrame];
AAC/2 ch

Recording mode and transfer rate:
[AVCHD]
[1080/60p];
Maximum 28 Mbps (VBR)
[PH];
Maximum 24 Mbps (VBR)
[HA];
Average 17 Mbps (VBR)
[HG];
Average 13 Mbps (VBR)
[HE];
Average 5 Mbps (VBR)

[MP4/iFrame]
[1080];
Maximum 28 Mbps (VBR)
[720];
Average 9 Mbps (VBR)
[iFrame];
Maximum 28 Mbps (VBR)
Refer to the Owner's Manual (PDF format) for the picture size and recordable time of a motion picture.

Still picture recording format:
JPEG (Design rule for Camera File system, based on Exif 2.2 standard)
Refer to the Owner's Manual (PDF format) for picture size of a still picture and number of recordable pictures.

Recording media:
SD Memory Card
SDHC Memory Card
SDXC Memory Card
Refer to the Owner's Manual (PDF format) for details on SD cards usable in this unit.

Image sensor:
1/5.8 ″ 1MOS image sensor
Total; 2510 K
Effective pixels;
Motion picture; 2200 K (16:9)*
Still picture;
2200 K (16:9), 1700 K (4:3), 1670 K (3:2)

Lens:
Auto Iris, 50× optical zoom, F1.8 to F4.2
Focal length;
2.06 mm to 103 mm
Macro (Full range AF)
35 mm equivalent;
Motion picture;
28.0 mm to 1740 mm (16:9)*
Still picture;
28.0 mm to 1740 mm (16:9),
34.0 mm to 1766 mm (4:3),
33.6 mm to 1714 mm (3:2)

Minimum focus distance;
Normal; Approx. 2.0 cm (0.8″) (Wide)/
Approx. 2.2 m (7.2 feet) (Tele)
Tele Macro; Approx. 1.1 m (3.6 feet) (Tele)
Intelligent Auto Macro;
Approx. 1.0 cm (0.4″) (Wide)/
Approx. 1.1 m (3.6 feet) (Tele)

Zoom:
i.Zoom OFF 62×*, 90× i.Zoom, 150×/3000× digital zoom
(Using image sensor effective area)

* When [O.I.S.] is set to [Standard] and Level Shot Function is set to off.

Image stabilizer function:
Optical (Hybrid Optical Image Stabilizer, Active Mode (Rotation correction), Optical Image Stabilizer Lock function)

Level Shot Function:
Off/Normal/Strong

Creative Control:
[Miniature Effect]/[Silent movie]/[8mm movie]/[Time Lapse Rec]

Monitor:
2.7″ wide LCD monitor (Approx. 230 K dots)

Microphone:
Stereo (with a Zoom Microphone)

Minimum required illumination:
Approx. 4 lx (1/30 with Low Light Mode in the Scene Mode)
Approx. 1 lx with the Night Mode function

AV connector video output level:
1.0 Vp-p, 75 Ω, NTSC system

HDMI mini connector video output level:
HDMI™ (x.v.Color™) 1080p/1080i/480p

AV connector audio output level (Line):
251 mV, 600 Ω, 2 ch

HDMI mini connector audio output level:
[AVCHD]; Dolby Digital/Linear PCM
[iFrame], [MP4]; Linear PCM

USB:
Reader function
SD card; Read only (No copyright protection support)
Hi-Speed USB (USB 2.0), USB terminal Type micro AB
USB host function (for USB HDD)
Battery charging function (Charges from USB terminal when the main unit is off)

Dimensions:
53 mm (W)×59 mm (H)×116 mm (D)
[2.087 ″ (W)×2.323 ″ (H)×4.567 ″ (D)]
(including projecting parts)

Mass (Weight):
Approx. 216 g (Approx. 0.476 lbs.)
[without battery (supplied) and an SD card (optional)]

Mass (Weight) in operation:
Approx. 261 g (Approx. 0.575 lbs.)
[with battery (supplied) and an SD card (optional)]

Operating temperature:
0 °C to 40 °C (32 °F to 104 °F)

Operating humidity:
10%RH to 80%RH

Battery operation time:
See page 14

Wireless transmitter:
Compliance standard; IEEE802.11b/g/n
Frequency range used;
Central frequency 2412 MHz to 2462 MHz [11ch]
Encryption method; Wi-Fi compliant WPA™/WPA2™/WEP
Access method; Infrastructure mode

NFC:
Compliance standard; ISO/IEC 18092 NFC-F (Passive Mode)

AC adaptor
Information for your safety

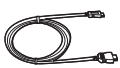
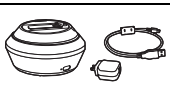
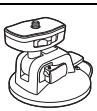
Power source:
AC 110 V to 240 V, 50/60 Hz
AC input:
0.25 A
DC output:
DC 5.0 V, 1.8 A

Dimensions:
66.4 mm (W)×58.5 mm (H)×31 mm (D)
[2.62 ″ (W)×2.30 ″ (H)×1.22 ″ (D)]

Mass (Weight):
Approx. 60 g (Approx. 0.132 lbs.)

Optional accessories

Some optional accessories may not be available in some countries.

Accessory No.	Figure	Description
VW-BC10PP		Battery charger
VW-VBT190*1		Rechargeable Lithium Ion Battery Pack
VW-VBT380		Rechargeable Lithium Ion Battery Pack
RP-CDHM15 RP-CDHM30		HDMI mini cable
VW-SK12PP		Shoe adaptor
VW-ACT190PP		Accessory kit
VW-LED1PP*2		LED Video Light
VW-CTR1PP		Remote Pan Tilt Cradle
VW-SCA100		Suction Cup Mount
RP-CMC10PP		Video Camera Mount (For Handlebar)

*1 Please refer to page 14, concerning the battery charging time and available recording time.

*2 To use the LED Video Light/VW-LED1PP, the Shoe adaptor/VW-SK12PP is required.

NOTE:

Accessories and/or model numbers may vary by country. Please consult your local dealer.

Product numbers correct as of Nov. 2014. These may be subject to change.

Accessory Order Form (For USA Customers)

Please photocopy this form when placing an order.

1. Model # _____

2. Items Ordered

Accessory #	Description	Price Each	Quantity	Total Price
			Shipping & Handling	$6.95
			Subtotal	
			Your State & Local Sales Tax	
			Total	

3. Method of payment (check one)

☐ American Express

☐ VISA Credit Card # _____

☐ MasterCard Expiration Date _____

☐ Discover Customer Signature _____

(Please do not send cash)

4. Shipping information (UPS delivery requires complete street address)

Ship To:
Mr.
Mrs.
Ms. _____
First Last

_____
Street Address

_____ _____ _____
City State Zip

Phone#:
Day ( ) _____
Night ( ) _____

TO OBTAIN ANY OF OUR ACCESSORIES YOU CAN DO ANY OF THE FOLLOWING:
VISIT YOUR LOCAL PANASONIC DEALER
OR
CALL PANASONIC'S ACCESSORY ORDER LINE AT 1-800-332-5368
[6 AM-6 PM M-F, PACIFIC TIME]
OR
MAIL THIS ORDER TO: PANASONIC NATIONAL PARTS CENTER
20421 84th Ave. S., Kent, WA 98032

In CANADA, please contact your local Panasonic dealer for more information on Accessories.

Limited Warranty (ONLY FOR U.S.A.)

Panasonic Products Limited Warranty

Limited Warranty Coverage (For USA Only)
If your product does not work properly because of a defect in materials or workmanship, Panasonic Corporation of North America (referred to as "the warrantor") will, for the length of the period indicated on the chart below, which starts with the date of original purchase ("warranty period"), at its option either (a) repair your product with new or refurbished parts, (b) replace it with a new or a refurbished equivalent value product, or (c) refund your purchase price. The decision to repair, replace or refund will be made by the warrantor.

Product or Part Name	Parts	Labor
High Definition Video Camera	1 Year	90 Days
All included Accessories (Except Non-Rechargeable Batteries)	90 Days	Not Applicable
Only Non-Rechargeable Batteries	10 Days	Not Applicable

During the "Labor" warranty period there will be no charge for labor. During the "Parts" warranty period, there will be no charge for parts. This Limited Warranty excludes both parts and labor for non-rechargeable batteries, antennas, and cosmetic parts (cabinet). This warranty only applies to products purchased and serviced in the United States. This warranty is extended only to the original purchaser of a new product which was not sold "as is".

Mail-In Service--Online Repair Request

Online Repair Request
To submit a new repair request and for quick repair status visit our Web Site at www.panasonic.com/support.

When shipping the unit, carefully pack, include all supplied accessories listed in the Owner's Manual, and send it prepaid, adequately insured and packed well in a carton box. When shipping Lithium Ion batteries please visit our Web Site at www.panasonic.com/BatteryHandling as Panasonic is committed to providing the most up to date information. Include a letter detailing the complaint, a return address and provide a daytime phone number where you can be reached. A valid registered receipt is required under the Limited Warranty.

IF REPAIR IS NEEDED DURING THE WARRANTY PERIOD, THE PURCHASER WILL BE REQUIRED TO FURNISH A SALES RECEIPT/PROOF OF PURCHASE INDICATING DATE OF PURCHASE, AMOUNT PAID AND PLACE OF PURCHASE. CUSTOMER WILL BE CHARGED FOR THE REPAIR OF ANY UNIT RECEIVED WITHOUT SUCH PROOF OF PURCHASE.

Limited Warranty Limits And Exclusions
This warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by the warrantor, or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, introduction of sand, humidity or liquids, commercial use such as hotel, office, restaurant, or other business or rental use of the product, or service by anyone other than a Factory Service Center or other Authorized Servicer, or damage that is attributable to acts of God.

THERE ARE NO EXPRESS WARRANTIES EXCEPT AS LISTED UNDER "LIMITED WARRANTY COVERAGE".
THE WARRANTOR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY.
(As examples, this excludes damages for lost time, travel to and from the servicer, loss of or damage to media or images, data or other memory or recorded content. The items listed are not exclusive, but for illustration only.)
ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE PERIOD OF THE LIMITED WARRANTY.
Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the exclusions may not apply to you.
This warranty gives you specific legal rights and you may also have other rights which vary from state to state. If a problem with this product develops during or after the warranty period, you may contact your dealer or Service Center. If the problem is not handled to your satisfaction, then write to:

Consumer Affairs Department
Panasonic Corporation of North America
661 Independence Pkwy
Chesapeake, VA 23320

PARTS AND SERVICE, WHICH ARE NOT COVERED BY THIS LIMITED WARRANTY, ARE YOUR RESPONSIBILITY.

Shop Accessories!

for all your Panasonic gear

Go to

www.panasonic.com/accessories

Get everything you need to get the most out of your Panasonic products
Accessories & Parts for your Camera, Phone, A/V products, TV, Computers & Networking, Personal Care, Home Appliances, Headphones, Batteries, Backup Chargers & more…

Customer Services Directory

For Product Information, Operating Assistance, Parts, Owner's Manuals, Dealer and Service info go to www.panasonic.com/support

For the hearing or speech impaired TTY: 1- 877-833-8855

As of October 2014

Warranty (For Canadian Customers)

Panasonic Canada Inc.
5770 Ambler Drive, Mississauga, Ontario L4W 2T3

PANASONIC PRODUCT – LIMITED WARRANTY

Panasonic Canada Inc. warrants this product to be free from defects in material and workmanship under normal use and for a period as stated below from the date of original purchase agrees to, at its option either (a) repair your product with new or refurbished parts, (b) replace it with a new or a refurbished equivalent value product, or (c) refund your purchase price. The decision to repair, replace or refund will be made by Panasonic Canada Inc.

Camcorder Products - One (1) year, parts and labour

This warranty is given only to the original purchaser, or the person for whom it was purchased as a gift, of a Panasonic brand product mentioned above sold by an authorized Panasonic dealer in Canada and purchased and used in Canada, which product was not sold "as is", and which product was delivered to you in new condition in the original packaging.

IN ORDER TO BE ELIGIBLE TO RECEIVE WARRANTY SERVICE HEREUNDER, A PURCHASE RECEIPT OR OTHER PROOF OF DATE OF ORIGINAL PURCHASE, SHOWING AMOUNT PAID AND PLACE OF PURCHASE IS REQUIRED

LIMITATIONS AND EXCLUSIONS

This warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by Panasonic Canada Inc., or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, improper batteries, power line surge, lightning damage, modification, introduction of sand, humidity or liquids, commercial use such as hotel, office, restaurant, or other business or rental use of the product, or service by anyone other than an Authorized Servicer, or damage that is attributable to acts of God.

Dry cell batteries are also excluded from coverage under this warranty. Rechargeable batteries are warranted for ninety (90) days from date of original purchase.

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In certain instances, some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, or the exclusion of implied warranties, so the above limitations and exclusions may not be applicable. This warranty gives you specific legal rights and you may have other rights which vary depending on your province or territory.

WARRANTY SERVICE

For product operation, repairs and information assistance, please visit our Support page:

www.panasonic.ca/english/support

IF YOU SHIP THE PRODUCT TO A SERVICENTRE
Carefully pack and send prepaid, adequately insured and preferably in the original carton.
Include details of the defect claimed, and proof of date of original purchase.

Panasonic Corporation of North America
Two Riverfront Plaza, Newark, NJ 07102-5490
http://www.panasonic.com

Panasonic Canada Inc.
5770 Ambler Drive, Mississauga, Ontario, L4W 2T3
www.panasonic.com

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